REMARKS

I. PRELIMINARY REMARKS

Claims 18, 22, 25, 31, 33-35 and 55 have been amended. No claims have been added. Claim 32 has been canceled. Claims 1-31, 33-35 and 53-62 remain in the application. Claims 10, 11, 16 and 17 have been withdrawn from consideration. Reexamination and reconsideration of the application are respectfully requested.

II. REJECTION UNDER 35 U.S.C. § 103

A. The Rejection

Claims 1-9, 12-15, 18-35 and 53-62 have been rejected under 35 U.S.C. § 103 as being unpatentable over the combined teachings of U.S. Patent Pub. No. 2001/0045364 to Hockaday et al. ("the Hockaday '364 publication") and U.S. Patent No. 5,070,899 to Matkovich et al. ("the Matkovich '899 patent"). The rejection under 35 U.S.C. § 103 is respectfully traversed with respect to the claims as amended above. Reconsideration thereof is respectfully requested.

B. The Cited References

The Hockaday '364 publication discloses a variety of hydrogen generation devices that provide a ***controlled fuel stream***. [Abstract and paragraph 0017.] One of the key features of the Hockaday generation devices is that they are ***operable in any orientation***. [Abstract and paragraph 0017.] As illustrated in Figure 9, which was referenced in the Office Action, one of the hydrogen generation devices stores fuel 7 in a wicking material 114 that is inside a bladder 113. The bladder 113 maintains pressure on the fuel 7. A puncture needle 111 is used to connect the bladder 113 to a container 122 with catalytic surfaces 107. Hydrogen gas, which is produce as a result of the interaction between the

fuel 7 and the catalytic surfaces 107, is free to flow out of the container 122. In order to control gas production, the flow of fuel 7 through the needle 111 is actively controlled by a valve 110. In other words, ***absent the ability to close the valve 110***, fuel 7 would be forced through the needle 111 by the bladder 113, and hydrogen gas would ***flow uncontrollably*** out of the container 122.

Turning to Figure 3, the Hockaday percolation generator 12 includes fuel 7 and wicking material 39 within a porous hydrophobic liner 32. The liner 32 is located within an elastic chamber 38. A capillary tube 40 with a catalyst coating 33 is located within an unnumbered structure positioned within the wicking material 39. It appears that the capillary tube 40 receives fuel 7 by way of the capillary exit 35. Hydrogen produced by the reaction within the capillary tube 40 exists the unnumbered structure through a filter 31. Fuel 7 and, apparently, byproducts are returned to the interior of the liner 32 by way of an exit 34 and a vent 42. Excess hydrogen that fills a void 36 between the liner 32 and elastic chamber 38 as the fuel 7 is consumed is vented by a gas pressure vent 37.

Referring first to Figure 1, the Matkovich '899 patent discloses a check valve 10 that is designed to ***facilitate the downward flow*** of a first liquid and to prevent upward flow (i.e. backflow) through the valve. [Column 2, lines 1-19.] The first fluid is free to flow in one direction and backflow is prevented. In other words, there is ***no "closed" setting*** for the valve. The configuration of the check valve 10 is also such that it operates only when in a generally vertical orientation. If, for example, the check valve was turned sideways or upside down, the first liquid would flow back through the porous elements 12 and 13 because the porous elements are specifically designed to facilitate liquid flow. [Column 3, lines 25-30; and column 5, lines 8-19.] Turning to Figure 2, the Matkovich '899 patent discloses a check valve 20 for gas that is designed to facilitate upward flow and to prevent downward flow (i.e. backflow) through the valve. [Column 2, lines 20-32.] Here too, there is no "closed" setting for the valve.

C. Discussion Concerning Claims 1-9 and 53

Independent claim 1 calls for a combination of elements including "an open region that connects [a] fuel reservoir to [a] reaction chamber" and "a ***passive structure*** located within the open region adapted to resist fluid flow from the fuel reservoir to the reaction chamber." The respective combinations defined by claims 2-9 and 53 include, *inter alia*, the elements recited in claim 1.

Applicant respectfully submits that the cited references fail to teach or suggest the claimed combinations. For example, and as noted in the Office Action, the Hockaday valve 110 is not a "passive structure." The Office Action has taken the position that it would have been obvious to replace the Hockaday valve 110 with the Matkovich fluid check valve 10 "in order to prevent backflow and yet still allow the desired fluid flow to the reaction chamber." [Office Action at page 3.]

There are a variety of errors associated with this position. First and foremost, replacing the Hockaday valve 110 with a check valve that ***cannot prevent fluid flow in the flow direction*** and merely prevents backflow, i.e. the Matkovich fluid check valve 10, would destroy much of the functionality of the Hockaday hydrogen generation device.[1] Hydrogen will flow uncontrollably from the Hockaday container 122 unless there is a valve that can stop the supply of fuel 7 to the container. The use of the Matkovich fluid check valve 10, which is specifically designed to facilitate fluid flow in the intended flow direction, will result in uncontrolled flow (albeit without backflow into the bladder 113 by way of the needle 111) from the Hockaday container 122. The Hockaday hydrogen generation device is also designed to function at any orientation. The Matkovich fluid check valve 10 ***can only function in certain orientations*** and, accordingly, would further degrade the functionality of the Hockaday hydrogen generation device if used in place of the Hockaday valve 110.

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[1] As noted by the Federal Circuit and Patent Office Board of Appeals, it simply is not obvious to modify a prior art apparatus in such a manner that it will not function in its intended manner. *See In re Gordon*, 221 USPQ 1125, 1127 (Fed. Cir. 1984) and *Ex Parte Weber*, 154 USPQ 491, 492 (Pat. Off. Bd. Ap. 1967). *See also* MPEP § 2143.01.

In response to the arguments above, the Office Action asserted that "[a]pplicant argues that the valve of Matkovich cannot prevent fluid flow and would destroy the reference of Hockaday." [Office Action at page 4.] With respect to the first portion of the assertion, applicant has not argued, and is not now arguing, that the Matkovich valves cannot prevent flow. To the contrary, applicant has argued that the Matkovich valve ***only prevents flow in one direction (i.e. prevents backflow), facilitates flow in the other direction, and can only function in certain orientations***.

In further response to the arguments above, the Office Action asserted that "the knowledge generally available to one of ordinary skill in the art provides for the motivation to substitute functionally equivalent structures, such as one valve for another." [Office Action at page 4.] Even assuming for the sake of argument that this assertion is accurate, the Matkovich fluid check valve 10 is not the functional equivalent of the Hockaday valve 110. The Hockaday valve 110 is (1) capable of preventing fluid flow in the flow direction and (2) capable of operating in any orientation. The Matkovich fluid check valve 10, one the other hand, is only capable of preventing fluid flow in the backflow direction and is only capable of operating within a small range of orientations.

Finally, the Office Action asserted that the Hockaday '364 publication "fails to provide for any specific design requirements for the valve (110) which would also motive one of ordinary skill in the art to look to other known devices which would have a reasonable expectation of success." [Office Action at page 4.] With respect to the purported lack of design requirements, the Hockaday '364 publication explicitly states that the valve is used to "control the output of the hydrogen generator." [Paragraph 0123.] Output control is, therefore, an explicit requirement. The Hockaday generation devices are also ***operable in any orientation***. [Abstract and paragraph 0017.] As such, one of skill in the art would recognize that an implicit requirement for the valve 110 is that it must also be operable in any orientation.

Turning to the "expectation of success" issue raised in the Office Action, a valve such as the Matkovich fluid check valve 10, which merely prevents backflow and facilitates flow in the intended direction, is incapable of fulfilling the "outlet control" requirement. Thus, one of skill in the art would expect failure, not success. Additionally, a valve such as the

Matkovich fluid check valve 10, which is only capable of operating within a small range of orientations, is incapable of fulfilling the "any orientation" requirement. For this additional reason, one of skill in the art would the expect failure, not success.

For the reasons presented above, applicant respectfully submits that the Office Action failed to make a *prima facia* case of obviousness with respect to claims 1-9 and 53 and that the rejection of claims 1-9 and 53 under 35 U.S.C. § 103 should be withdrawn.

D. Discussion Concerning Claims 12-15 and 54

Independent claim 12 calls for a combination of elements including "an open region that connects [a] fuel reservoir to [a] reaction chamber" and "a ***passive structure located within the open region*** adapted to create ***capillary forces to resist flow*** of the fuel containing substance from the fuel reservoir to the reaction chamber." The respective combinations defined by claims 13-15 and 54 include, *inter alia*, the elements recited in claim 12.

Applicant respectfully submits that the cited references fail to teach or suggest the claimed combinations. For example, and referring to Sections II-B and II-C above, the Hockaday '364 publication fails to teach or suggest a "passive structure" and there is simply no reason, other than a hindsight attempt to replicate the claimed inventions, to substitute the Matkovich check valve 10 for the Hockaday valve 110. The purportedly obvious modification would destroy much of the functionality of the Hockaday hydrogen generation device. There is also nothing in the references themselves to suggest combining them in the manner proposed in the Office Action, and the Office Action failed to point to any knowledge in the art that would have suggested the proposed combination.

In response to the arguments above, the Office Action asserted that the Hockaday '364 publication "fails to provide for any specific design requirements for the valve (110) which would also motive one of ordinary skill in the art to look to other known devices which would have a reasonable expectation of success." [Office Action at page 5.] As discussed at length in the preceding section, there are in fact design requirements for

the valve 110, i.e. controlling the output of the hydrogen generator and being operable in any orientation. One of skill in the art would not have reasonably expected the substitution of the Matkovich fluid check valve 10 for the Hockaday valve 110 to have been a success because the Matkovich fluid check valve is incapable of fulfilling the aforementioned design requirements.

For the reasons presented above, applicant respectfully submits that the Office Action failed to make a *prima facia* case of obviousness with respect to claims 12-15 and 54 and that the rejection of claims 12-15 and 54 under 35 U.S.C. § 103 should be withdrawn.

E. Discussion Concerning Claims 18-21

Independent claim 18 calls for a combination of elements including "an open region that connects [a] fuel reservoir to [a] reaction chamber" and "control ***means***, associated with the open region, ***for passively resisting fluid flow*** from the fuel reservoir to the reaction chamber and permitting fluid flow from the fuel reservoir to the reaction chamber in response to the presence of a predetermined pressure gradient across the control means." The respective combinations defined by claims 19-21 include, *inter alia*, the elements recited in claim 18.

Applicant respectfully submits that the cited references fail to teach or suggest the claimed combinations. For example, and referring to Sections II-B and II-C above, the Hockaday valve 110 does not perform the function of passively resisting fluid flow. The Matkovich '899 patent, which discloses a one way check valve, fails to remedy this deficiency. Most notably, the use of the Matkovich check valve 10 in place of the Hockaday valve 110 would destroy much of the functionality of the Hockaday hydrogen generation device. There is also nothing in the references themselves to suggest combining them in the manner proposed in the Office Action, and the Office Action failed to point to any knowledge in the art that would have suggested the proposed combination.

In response to the arguments above, the Office Action asserted that the Matkovich check valve prevents flow. [Office Action at page 5.] As discussed in greater detail above,

the Matkovich check valve prevents backflow one direction and facilitates flow in the other direction. Such a valve simply cannot perform the functions required of the Hockaday valve 110. It should also be noted again that the Hockaday valve 110 does not merely prevent (or allow) flow in the intended flow direction, it does so in any orientation. The Matkovich check valve is also unable to perform this function.

For the reasons presented above, applicant respectfully submits that the Office Action failed to make a *prima facia* case of obviousness with respect to independent claims 18-21 and that the rejection of claims 18-21 under 35 U.S.C. § 103 should be withdrawn.

F. Discussion Concerning Claims 22-30

Independent claim 22 is direct to a fuel cartridge comprising "a fuel reservoir" and "a reaction chamber." The "reaction chamber" includes "a catalyst, an inlet operably connected to the fuel reservoir, a gas outlet, ***means ... for letting liquid out of the reaction chamber,*** and a substantially gas permeable/substantially liquid impermeable structure that substantially surrounds the catalyst and separates the inlet from the gas outlet." The respective combinations defined by claims 23-30 include, *inter alia*, the elements recited in claim 22.

Applicant respectfully submits that the cited references fail to teach or suggest the claimed combinations. For example, the Office Action has taken the position that:

> the outlet labeled with an arrow and H_2 at the top of Figure 9 [of the Hockaday '364 publication] would be an outlet which liquid could leave the reaction chamber (122) without communicating with the fuel reservoir (7). An outlet is an outlet regardless, regardless of what is flowing through it.

[Office Action at page 5.] Even assuming for the sake of argument that this position is reasonable, applicant respectfully submits that it has been rendered moot by the amendment to claim 22. In particular, the "outlet labeled with an arrow and H_2 at the top of Figure 9" ***does not perform the function of "letting liquid out of the reaction chamber."*** The liquid fuel 7 that enters the Hockaday container 122 is drawn back into the bladder 113 (note arrow 120) and/or is ***prevented*** from exiting the "outlet labeled

with an arrow and H_2 at the top of Figure 9" by a filter 106. [Paragraph 0123.] The liquid impermeability of the filter 106 was discussed in the context of other claims on page 6 of the Office Action. As the "outlet labeled with an arrow and H_2 at the top of Figure 9" does not perform the function of letting liquid out of the container 122 (the purported "reaction chamber"), it cannot be a "means ... for letting liquid out of the reaction chamber."[2]

Turning to the Matkovich '899 patent, it is not entirely clear how the Matkovich '899 patent even relates to the inventions defined by claims 22-30 and is being applied in the rejection under 35 U.S.C. § 103. Nevertheless, applicant respectfully submits that the Matkovich '899 patent fails to remedy the above-identified deficiencies in the Hockaday '364 publication. ***In order to clarify the issues, applicant hereby requests that the next Office Action specifically discuss how the Matkivich '899 patent is involved in the rejection of claims 22-30.***

For the reasons presented above, applicant respectfully submits that Hockaday '364 publication and Matkovich '899 patent do not establish a *prima facia* case of obviousness of claims 22-30 and that the rejection of claims 22-30 under 35 U.S.C. § 103 should be withdrawn.

G. Discussion Concerning Claims 31 and 33-35

Independent claim 31 is directed to a "reaction chamber" that comprises "an external housing defining a first reactant inlet, a liquid outlet and a gas outlet" and "an ***internal housing*** that is located within the external housing that separates the first reactant inlet and the liquid outlet from the gas outlet, is formed at least partially from a substantially gas permeable/substantially liquid impermeable material, and ***includes an inlet*** operably connected to the external housing first reactant inlet ***and a liquid outlet*** operably connected to the external housing liquid outlet." The respective combinations defined by claims 33-35 include, *inter alia*, the elements recited in claim 31.

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[2] "[T]he application of a prior art reference to a means or step plus function limitation requires that the prior art element perform the ***identical function*** specified in the claim." MPEP § 2182, emphasis added.

Applicant respectfully submits that the Hockaday '364 publication and the Matkovich '899 patent, whether viewed alone or in combination, fail to teach or suggest the claimed combinations. For example, the filter 106 is not an "internal housing" and it does not include "an inlet" and "a liquid outlet."

Turning to the Matkovich '899 patent, it is not entirely clear how the Matkovich '899 patent even relates to the inventions defined by claims 31 and 33-35 and is being applied in the rejection under 35 U.S.C. § 103. Nevertheless, applicant respectfully submits that the Matkovich '899 patent fails to remedy the above-identified deficiencies in the Hockaday '364 publication. ***In order to clarify the issues, applicant hereby requests that the next Office Action specifically discuss how the Matkivich '899 patent is involved in the rejection of claims 31 and 33-35.***

For the reasons presented above, applicant respectfully submits that Hockaday '364 publication and Matkovich '899 patent do not establish a *prima facia* case of obviousness of claims 31 and 33-35 and that the rejection of claims 31 and 33-35 under 35 U.S.C. § 103 should be withdrawn.

H. Discussion Concerning Claims 55-62

Independent claim 55 calls for a combination of elements comprising "fuel reservoir," "***a reaction chamber*** defining an interior surface, a fuel inlet and ***only one gas outlet,***" "***an enclosed substantially gas permeable/substantially liquid impermeable structure defining an interior*** operably connected to the fuel inlet and an exterior surface and located within the reaction chamber such that a gap extends around the exterior surface from the exterior surface to the interior surface of the reaction chamber and the gap is in gaseous communication with the only one gas outlet of the reaction chamber" and "***a catalyst located within the interior of*** the enclosed substantially gas permeable/substantially liquid impermeable structure." The respective combinations defined by claims 56-62 include, *inter alia*, the elements recited in claim 55.

Applicant respectfully submits that the Hockaday '364 publication and the Matkovich '899 patent, whether viewed alone or in combination, fail to teach or suggest the claimed combinations. For example, the Office Action appears to have taken the position that the container 122 illustrated in Figure 9 of Hockaday '364 publication corresponds to the claimed "reaction chamber" because it has a single gas outlet. [Office Action at page 6.] Even assuming for the sake of argument that this is a reasonable interpretation of the claims, the device illustrated in Figure 9 of the Hockaday '364 publication does not include "an enclosed substantially gas permeable/substantially liquid impermeable structure" within the container 122. Although there is gas permeable/liquid impermeable filter 106 within the container 122, the filter 106 is not an enclosed structure with a catalyst located within the interior thereof, as is called for in claim 55.

Turning to the Matkovich '899 patent, it is not entirely clear how the Matkovich '899 patent even relates to the inventions defined by claims 55-62 is being applied in the rejection under 35 U.S.C. § 103. Nevertheless, applicant respectfully submits that the Matkovich '899 patent fails to remedy the above-identified deficiencies in the Hockaday '364 publication. ***In order to clarify the issues, applicant hereby requests that the next Office Action specifically discuss how the Matkivich '899 patent is involved in the rejection of claims 55-62.***

Finally, with respect to the discussion of transitional phrases and MPEP § 2111.03 on page 6 of the Office Action, applicant notes that the phrase "a single gas outlet" was a negative limitation that, notwithstanding the use of the word "comprising" in the preamble, required the claimed reaction chamber to have only one gas outlet. To the extent that the use of phrase "a single" has caused confusion, applicant has changed it to "only one."

For the reasons presented above, applicant respectfully submits that the Office Action failed to make a *prima facia* case of obviousness and that the rejection of claims 55-62 under 35 U.S.C. § 103 should be withdrawn.

III. CLOSING REMARKS

In view of the foregoing, it is respectfully submitted that the claims in the application are in condition for allowance. Reexamination and reconsideration of the application are respectfully requested. Allowance of the claims at an early date is courteously solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is respectfully requested to call applicant's undersigned representative at (310) 563-1458 to discuss the steps necessary for placing the application in condition for allowance.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-2025. Should such fees be associated with an extension of time, applicant respectfully requests that this paper be considered a petition therefor.

7/25/06
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Respectfully submitted,

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